II. Amendment to Drawings and Remarks

In ¶ 3 of the Office Action, the Examiner requested clarify the prior submission of drawings in the application. The Applicant confirms that the set of formal drawings submitted June 18, 2002, is the set of drawings for examination. According to the Examiner the set submitted is missing sheet 14 of 27 (FIG. 8-1) and includes a duplicate of sheet 16 of 27 (FIG. 10). (Office Action, ¶ 3.) However, the Applicant's file copy of the June 18, 2002 submission includes sheet 14 of 27 and has only one copy of sheet 16 of 27. Thus, Applicant believes that the papers submitted may have been mishandled by the Office. To correct the record, Applicant encloses with this paper a copy of sheet 14 of 27 (FIG. 8-1) that is marked as a "Replacement Sheet." Because Applicant believes that this sheet was previously submitted and Applicant makes no changes to this drawing sheet, Applicant respectfully requests that the Examiner enter the drawing and confirm that the submission of this sheet does not constitute an amendment of the application.

III. Amendment to Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (currently amended): A method for evaluating an air conditioning chiller having a ~~group of components related to efficient operation~~ condenser, an evaporator, and a compressor, comprising the steps of:

inputting ~~chiller operating parameter measurement data~~ condenser data and evaporator data into a computing device, which performs the steps of:~~;~~

~~the computing device~~ computing a condenser efficiency loss value ~~in response to a predetermined association~~ based on a condenser relationship between ~~chiller~~ condenser efficiency and the ~~input chiller operating parameter measurement~~ condenser data;

~~the computing device~~ comparing the ~~computed~~ condenser efficiency loss value to a ~~predetermined~~ condenser loss threshold value to assess chiller efficiency; ~~and~~

~~the computing device identifying a chiller component problem corresponding to the predetermined association if a comparison between the computed value and the predetermined value indicates a negative impact upon chiller efficiency; and~~

~~outputting an indication of a remedial action associated with the identified problem.~~

computing an evaporator efficiency loss value based on an evaporator relationship between evaporator efficiency and the evaporator data;

comparing the evaporator efficiency loss value to an evaporator efficiency loss threshold value;

calculating a chiller efficiency loss value by totaling the condenser efficiency loss value and the evaporator efficiency loss value.

Claim 2 (currently amended): The method ~~claimed in~~ of claim 1, ~~wherein~~ in which the inputting step comprises:

a person reading instruments measuring ~~chiller operating parameters~~condenser parameters and evaporator parameters; and

a person keying the ~~chiller operating parameter measurement data~~ condenser data based on the condenser parameters and evaporator data based on the evaporator parameters into the computing device.

Claim 3 (currently amended): The method of ~~claimed in~~ claim 1, ~~wherein~~ in which the inputting step comprises:

a person reading the condenser data and the evaporator data from a plurality of instruments collectively measuring ~~chiller operating parameters~~ at least one condenser parameter and at least one evaporator parameter;

a person keying the ~~chiller operating parameter measurement data~~ condenser data and the evaporator data into a portable handheld device; and

the computing device receiving the ~~chiller operating parameter measurement data~~ condenser data and the evaporator data via the handheld device.

Claim 4 (currently amended): The method of ~~claimed in~~ claim 1, ~~wherein~~ in which the inputting step comprises:

~~electronic sensors measuring chiller operating parameters; and~~

~~the computing device~~ reading ~~the chiller operating parameter measurement data from the electronic sensors~~ the condenser data and the evaporator data from one or more electronic sensors that collectively measure at least one condenser parameter and at least one evaporator parameter.

Claim 5 (currently amended): The method ~~claimed in~~of claim 1, ~~wherein~~ in which the inputting step comprises:

~~electronic sensors measuring chiller operating parameters; and~~

enabling a portable handheld device ~~reading the chiller operating parameter measurement data from the~~ to read the condenser data and the evaporator data from a plurality of electronic sensors that collectively measure at least one condenser parameter and at least one evaporator parameter; and

~~the computing device~~ receiving the ~~chiller operating parameter measurement data~~ condenser data and evaporator data via the handheld device.

Claim 6 (currently amended): The method ~~claimed in~~ of claim 1, further comprising the steps of:

A. enabling a user using a client computer to remotely via a computing network access a server computer associated with the computing device, and ~~wherein~~

B. ~~the inputting step comprises the client computer~~ transmitting from the client computer to the server computer the ~~chiller operating parameter measurement data~~ condenser data and evaporator data.

Claim 7 (currently amended): The method ~~claimed in~~ of claim 1, further comprising the steps of:

A. enabling a user using a client computer to remotely via a computing network access a server computer associated with the computing device, and ~~wherein~~

B. ~~the outputting step comprises the server computer~~ transmitting from the server computer to the client computer ~~the~~ an indication of a condenser remedial action and an evaporator remedial action ~~associated with the identified problem~~.

Claim 8 (currently amended): The method ~~claimed in~~ of claim 7, further comprising the step of enabling a provider of services associated with ~~identification of a~~ indication of a condenser remedial action and the evaporator remedial action ~~problem and outputting of an indication of a remedial action associated with the identified problem receiving~~ to receive monetary compensation from a recipient of the services.

Claim 9 (currently amended): The method ~~claimed in~~ of claim 7, further comprising the steps of:

A. enabling the user using the client computer to log on to the server computer;

B. ~~the server computer~~ transmitting from the server computer to the client computer an indication[s] of a plurality of chillers ~~from~~ about which a user can select to receive information;

C. enabling the user ~~selecting~~ to select at least one of the plurality of chillers ~~from the indications of a plurality of chillers~~; and

D. ~~the client computer~~ transmitting from the client computer to the server computer an indication of the selected chiller.

Claim 10 (currently amended): The method ~~claimed in~~ of claim 9, ~~wherein~~ in which the ~~indications of a~~ plurality of chillers includes a first chiller located ~~chillers~~ at a different ~~geographic sites from each other~~place from a second chiller.

Claim 11 (currently amended): The method ~~claimed in~~of claim 9, ~~wherein~~ in which the ~~indications of a~~ plurality of chillers includes ~~chillers~~ a first chiller installed in the same building as ~~each other~~a second chiller.

Claim 12 (withdrawn): A method for evaluating monetary cost of inefficient operation of an air conditioning chiller, comprising:

inputting chiller operating parameter measurement data into a computing device;

the computing device computing a measure of inefficiency in response to the input chiller operating parameter measurement data and a predetermined association between chiller efficiency and the input chiller operating parameter measurement data;

the computing device computing a monetary energy cost corresponding to the computed measure of inefficiency; and

outputting an indication of the measure of inefficiency and the corresponding monetary energy cost.

Claim 13 (withdrawn): The method claimed in claim 12, wherein the inputting step comprises:

a person reading instruments measuring chiller operating parameters; and

a person keying the chiller operating parameter measurement data into the computing device.

Claim 14 (withdrawn): The method claimed in claim 12, wherein the inputting step comprises:

a person reading instruments measuring chiller operating parameters;

a person keying the chiller operating parameter measurement data into a handheld device; and

the computing device receiving the chiller operating parameter measurement data via the handheld device.

Claim 15 (withdrawn): The method claimed in claim 12, wherein the inputting step comprises:

electronic sensors measuring chiller operating parameters; and

the computing device reading the chiller operating parameter measurement data from the electronic sensors.

Claim 16 (withdrawn): The method claimed in claim 12, wherein the inputting step comprises:

electronic sensors measuring chiller operating parameters; and

a handheld device reading the chiller operating parameter measurement data from the electronic sensors; and

the computing device receiving the chiller operating parameter measurement data via the handheld device.

Claim 17 (withdrawn): The method claimed in claim 12, further comprising the steps of a user using a client computer to remotely via a computing network access a server computer associated with the computing device, and wherein the inputting step comprises the client computer transmitting to the server computer the chiller operating parameter measurement data.

Claim 18 (withdrawn): The method claimed in claim 12, further comprising the steps of a user using a client computer to remotely via a computing network access a server computer associated with the computing device, and wherein the outputting step comprises the server transmitting to the client computer the indication of a remedial action associated with the identified problem.

Claim 19 (withdrawn): The method claimed in claim 18, further comprising the step of a provider of services associated with the identification of a problem and outputting of an indication of a remedial action associated with the identified problem receiving monetary compensation from a recipient of the services.

Claim 20 (withdrawn): The method claimed in claim 18, further comprising the steps of:

the user using the client computer to log on to the server;

the server transmitting to the client indications of a plurality of chillers from which a user can select;

the user selecting the chiller from the indications of a plurality of chillers; and

the client computer transmitting to the server computer an indication of the selected chiller.

Claim 21 (withdrawn): The method claimed in claim 20, wherein the indications of a plurality of chillers includes chillers at different geographic sites from each other.

Claim 22 (withdrawn): The method claimed in claim 20, wherein the indications of a plurality of chillers includes chillers installed in the same building as each other.

Claim 23 (withdrawn): A method for evaluating an air conditioning chiller having a condenser susceptible to problems causing chiller operational inefficiency, comprising:

inputting condenser inlet temperature into a computing device;

the computing device comparing condenser inlet temperature to a predetermined value corresponding to efficient chiller operation;

the computing device determining if condenser inlet temperature exceeds the predetermined value corresponding to efficient chiller operation;

the computing device identifying a cooling tower-related problem as a problem associated with a condenser inlet temperature exceeding the predetermined value corresponding to efficient chiller operation; and

outputting an indication to service one or more cooling tower subsystem elements in response to having identified a cooling tower-related problem.

Claim 24 (withdrawn): The method claimed in claim 23, wherein the step of outputting an indication to service one or more cooling tower subsystem elements comprises outputting an indication to service an element selected from the group consisting of: cooling tower and cooling tower controls.

Claim 25 (withdrawn): A method for evaluating an air conditioning chiller having a condenser susceptible to problems causing chiller operational inefficiency, comprising:

inputting condenser refrigerant temperature and condenser outlet temperature into a computing device;

the computing device computing a condenser approach value in response to a computed difference between condenser refrigerant temperature and condenser outlet temperature;

the computing device comparing the condenser approach value to a predetermined value corresponding to efficient chiller operation;

the computing device determining if condenser approach value exceeds the predetermined value corresponding to efficient chiller operation;

the computing device identifying excess condenser approach as a problem associated with a condenser approach value exceeding the predetermined value corresponding to efficient chiller operation; and

outputting an indication to service one or more condenser subsystem elements in response to having identified excess condenser approach as a problem.

Claim 26 (withdrawn): The method claimed in claim 25, wherein the step of outputting an indication to service one or more condenser subsystem elements comprises outputting an indication to service an element selected from the group consisting of: condenser tubes, division plate, and division plate gasket.

Claim 27 (withdrawn): The method claimed in claim 25, wherein the step of the computing device computing a condenser approach value comprises:

inputting a running current measured at a compressor motor of the chiller;

computing a percentage load in response to the running current and a full load current;

computing the condenser approach in response to the difference between condenser refrigerant temperature and condenser outlet temperature as a fraction of the percentage load.

Claim 28 (withdrawn): A method for evaluating an air conditioning chiller having a condenser susceptible to problems causing chiller operational inefficiency, comprising:

inputting condenser pressure into a computing device;

the computing device comparing condenser pressure to a predetermined value corresponding to efficient chiller operation;

the computing device determining if condenser pressure exceeds the predetermined value corresponding to efficient chiller operation;

the computing device identifying non-condensables in the condenser as a problem associated with a condenser inlet temperature exceeding the predetermined value corresponding to efficient chiller operation; and

outputting an indication to service one or more condenser subsystem elements in response to having identified non-condensables in the condenser as the problem.

Claim 29 (withdrawn): A method for evaluating an air conditioning chiller having a condenser susceptible to problems causing chiller operational inefficiency, comprising:

inputting condenser inlet water pressure and condenser outlet water pressure into a computing device;

the computing device computing a condenser delta variance in response to a computed difference between condenser inlet water pressure and condenser outlet water pressure;

the computing device comparing the condenser delta variance to a predetermined value corresponding to efficient chiller operation;

the computing device determining if condenser delta variance exceeds the predetermined value corresponding to efficient chiller operation;

the computing device identifying low condenser water flow as a problem associated with a condenser delta variance exceeding the predetermined value corresponding to efficient chiller operation; and

outputting an indication to service one or more condenser subsystem elements in response to having identified low condenser water flow as the problem.

Claim 30 (withdrawn): The method claimed in claim 29, wherein the step of outputting an indication to service one or more condenser subsystem elements comprises outputting an indication to service an element selected from the group consisting of: condenser water strainer, condenser pump, condenser valves, and condenser controls.

Claim 31 (withdrawn): The method claimed in claim 29, wherein the step of the computing device computing a condenser delta variance in response to a computed difference between condenser inlet water pressure and condenser outlet water pressure comprises the steps of:

inputting a condenser design delta pressure; and

computing the square root of the ratio between the condenser design delta pressure and the difference between condenser inlet pressure and condenser outlet pressure.

Claim 32 (withdrawn): The method claimed in claim 31, wherein the step of the computing device computing a condenser delta variance further comprises:

inputting condenser inlet water temperature and condenser outlet water temperature;

computing a difference between condenser inlet water temperature and condenser outlet water temperature; and

adjusting the computed square root of the ratio between the condenser design delta pressure and the difference between condenser inlet pressure and condenser outlet pressure by

multiplying by the difference between condenser inlet water temperature and condenser outlet water temperature.

Claim 33 (withdrawn): A method for evaluating an air conditioning chiller having an evaporator susceptible to problems causing chiller operational inefficiency, comprising:

inputting chiller water outlet temperature into a computing device;

the computing device comparing chiller water outlet temperature to a predetermined value corresponding to efficient chiller operation;

the computing device determining if chiller water outlet temperature exceeds the predetermined value corresponding to efficient chiller operation;

the computing device identifying a low evaporator setpoint as a problem associated with chiller water outlet temperature exceeding the predetermined value corresponding to efficient chiller operation; and

outputting an indication to service the evaporator in response to having identified low evaporator setpoint as the problem.

Claim 34 (withdrawn): A method for evaluating an air conditioning chiller having an evaporator susceptible to problems causing chiller operational inefficiency, comprising:

inputting evaporator pressure, evaporator outlet temperature, and refrigerant type into a computing device;

the computing device computing a use temperature in response to evaporator pressure and refrigerant type;

the computing device computing an evaporator approach value in response to evaporator outlet temperature and use temperature;

the computing device comparing the evaporator approach value to a predetermined value corresponding to efficient chiller operation;

the computing device determining if the evaporator approach value exceeds the predetermined value corresponding to efficient chiller operation;

the computing device identifying excess evaporator approach as a problem associated with the evaporator approach value exceeding the predetermined value corresponding to efficient chiller operation; and

outputting an indication to service one or more evaporator subsystem elements in response to having identified excess evaporator approach as the problem.

Claim 35 (withdrawn): The method claimed in claim 34, wherein the step of outputting an indication to service one or more evaporator subsystem elements comprises outputting an indication to service an element selected from the group consisting of: refrigerant charge; evaporator tubes, division plate, and division plate gasket.

Claim 36 (withdrawn): The method claimed in claim 34, wherein the step of the computing device computing an evaporator approach value in response to evaporator outlet temperature and use temperature comprises the steps of:

inputting a running current at a compressor motor of the chiller;

computing a percentage load in response to the running current and a full load current; and

computing a difference between evaporator outlet temperature and use temperature; and

computing a product of the percentage load and the difference between evaporator outlet temperature and use temperature.

Claim 37 (withdrawn): A method for evaluating an air conditioning chiller, comprising:

inputting into a computing device indications identifying each of a plurality of chillers;

inputting chiller operating parameter measurement data into the computing device;

a user selecting a chiller of the plurality of chillers;

the computing device computing a measure of inefficiency of the selected chiller in response to the input chiller operating parameter measurement data and a predetermined association between chiller efficiency and the input chiller operating parameter measurement data; and

outputting an indication of the measure of inefficiency.

Claim 38 (withdrawn): The method claimed in claim 37, wherein each of the plurality of chillers is located at a different geographic site from all other chillers of the plurality.

Claim 39 (currently amended): A computer-readable medium having a program ~~product~~ for evaluating an air conditioning chiller having a condenser, an evaporator, and a compressor, ~~group of components related to efficient operation, the computer program product comprising a computer-usable data medium carrying thereon~~ comprising logic for:

~~means for~~ inputting ~~chiller operating parameter measurement data~~ condenser data and evaporator data into a computing device;

~~means for~~ computing a condenser efficiency loss value ~~in response to a predetermined association~~ based on a condenser relationship between ~~chiller~~ condenser efficiency and the ~~input chiller operating parameter measurement~~ condenser data;

~~means for~~ comparing the computed condenser efficiency loss value to a ~~predetermined~~ condenser loss threshold value to assess chiller efficiency;

~~means for identifying a chiller component problem corresponding to the predetermined association if a comparison between the computed value and the predetermined value indicates a negative impact upon chiller efficiency; and~~

~~means for outputting an indication of a remedial action associated with the identified problem.~~

computing an evaporator efficiency loss value based on an evaporator relationship between evaporator efficiency and the evaporator data;

comparing the evaporator efficiency loss value to an evaporator efficiency loss threshold value to assess chiller efficiency;

calculating a chiller loss value by totaling the condenser efficiency value and the evaporator efficiency value.

Claim 40 (withdrawn): A computer program product for evaluating an air conditioning chiller, the computer program product comprising a computer-usable data medium carrying thereon:

means for inputting chiller operating parameter measurement data into a computing device;

means for computing a measure of inefficiency in response to the input chiller operating parameter measurement data and a predetermined association between chiller efficiency and the input chiller operating parameter measurement data;

means for computing a monetary energy cost corresponding to the computed measure of inefficiency; and

means for outputting an indication of the measure of inefficiency and the corresponding monetary energy cost.

Claim 41 (withdrawn): A computer program product for evaluating an air conditioning chiller, the computer program product comprising a computer-usable data medium carrying thereon:

means for inputting into a computing device indications identifying each of a plurality of chillers;

means for inputting chiller operating parameter measurement data into the computing device;

means for selecting a chiller of the plurality of chillers;

means for computing a measure of inefficiency of the selected chiller in response to the input chiller operating parameter measurement data and a predetermined association between chiller efficiency and the input chiller operating parameter measurement data; and

means for outputting an indication of the measure of inefficiency.

Claim 42 (withdrawn): A system for evaluating an air conditioning chiller, comprising:

a user interface for inputting into a computing device indications identifying each of a plurality of chillers, for inputting chiller operating parameter measurement data, and for selecting a chiller of the plurality of chillers; and

a processor programmed for computing a measure of inefficiency of the selected chiller in response to the input chiller operating parameter measurement data and a predetermined association between chiller efficiency and the input chiller operating parameter measurement data and for outputting via the user interface an indication of the measure of inefficiency.

Claim 43 (withdrawn): The system claimed in claim 42, wherein:

the processor is included in a server computer; and

the user interface is presented on a client computer with which the server computer can communicate via a data network.

Claim 44 (withdrawn): The system claimed in claim 42, wherein:

the processor is included in a personal computer; and

the user interface is included in a handheld data device with which the personal computer can communicate via a synchronization mechanism.

Claim 45 (new): The method of claim 1 in which:

A. the condenser data is selected from the group consisting of:

i. a condenser inlet temperature;

ii. a condenser outlet temperature;

iii. a condenser refrigerant pressure;

iv. a condenser refrigerant temperature;

v. a condenser inlet pressure; and

vi. a condenser outlet pressure; and

B. the condenser loss threshold value is selected from the group consisting of:

i. an optimal condenser inlet temperature;

ii. an optimal condenser approach;

iii. an estimated condenser approach based on when the chiller was made;

iv. an optimal condenser pressure; and

v. an optimal condenser pressure drop.

Claim 46 (new): The method of claim 1 in which:

A. the evaporator data is selected from the group consisting of:

i. an evaporator refrigerant temperature;

ii. an evaporator outlet temperature;

iii. an evaporator refrigerant pressure; and

B. the evaporator loss threshold value is selected from the group consisting of:

i. an optimal evaporator approach;

ii. an optimal chiller water outlet temperature.

Claim 47 (new): The method of claim 1 in which the compressor data is selected from the group consisting of:

A. an actual compressor current and

B. a full load compressor current.

Claim 48 (new): The computer-readable medium of claim 39 in which:

A. the program further comprises logic for sensing a running current of the compressor motor;

B. the condenser data includes:

i. information sufficient to define a predetermined optimal condenser approach,

ii. a condenser refrigerant temperature, and

iii. a condenser outlet temperature; and

C. the computing logic includes logic for computing:

i. a fractional load current as the ratio of the running current to a full load current of the compressor motor;

ii. a full load condenser approach as the ratio of the difference between condenser refrigerant temperature and condenser outlet temperature to the fractional load current;

iii. a condenser approach difference as the difference between the full load condenser approach and the predetermined optimal condenser approach; and

iv. a condenser approach loss component of the condenser efficiency loss value as the condenser approach difference multiplied by a condenser approach efficiency factor if the condenser approach difference is greater than zero.

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Claim 49 (new): The computer-readable medium of claim 48 in which the condenser approach efficiency factor is approximately 2.

Claim 50 (new): The computer-readable medium of claim 49 in which:

D. the information sufficient to define the optimal condenser approach is a year in which the chiller was manufactured, and

E. the program further comprises logic for setting the optimal condenser approach as follows:

i. optimal condenser approach is set to approximately one if the chiller was made during 1990 or later;

ii. optimal condenser approach is set to approximately two if the chiller was made during the 1980s; and

iii. optimal condenser approach is set to approximately five if the chiller was made before 1980.

Claim 51 (new): The computer-readable medium of claim 49 in which the information sufficient to define the predetermined optimal condenser approach is a design condenser approach value.

Claim 52 (new): The computer-readable medium of claim 48 in which the program further comprises logic for:

A. indicating that the condenser requires service and

B. suggesting an action that may increase the efficiency of the condenser.

Claim 53 (new): The computer-readable medium of claim 39 in which:

A. the program further comprises logic for sensing a running current of the compressor motor;

B. the evaporator data includes:

i. information sufficient to define a predetermined optimal evaporator approach,

ii. an evaporator refrigerant temperature, and

iii. an evaporator outlet temperature; and

C. the computing logic includes logic for computing:

i. a fractional load current as the ratio of the running current to a full load current of the compressor motor;

ii. a full load evaporator approach as the ratio of the difference between the evaporator outlet temperature and the evaporator refrigerant temperature to the fractional load current;

iii. an evaporator approach difference as the difference between the full load evaporator approach and the predetermined optimal evaporator approach; and

iv. an evaporator approach component of the evaporator efficiency loss value as the evaporator approach difference multiplied by an evaporator approach efficiency factor if the evaporator approach difference is greater than zero.

Claim 54 (new): The computer-readable medium of claim 53 in which the evaporator approach efficiency factor is approximately 2.

Claim 55 (new): The computer-readable medium of claim 54 in which:

A. the information sufficient to define the optimal evaporator approach is a year in which the chiller was manufactured, and

B. the program further comprises logic for setting the optimal evaporator approach as follows:

i. optimal evaporator approach is set to approximately three if the chiller was made during 1990 or later;

ii. optimal evaporator approach is set to approximately four if the chiller was made during the 1980s; and

iii. optimal evaporator approach is set to approximately six if the chiller was made before 1980.

Claim 56 (new): The computer-readable medium of claim 54 in which the information sufficient to define the predetermined optimal evaporator approach is a design evaporator approach value.

Claim 57 (new): The computer-readable medium of claim 39 in which:

A. the condenser data includes:

i. information sufficient to define a predetermined optimal condenser pressure, and

ii. a condenser refrigerant pressure;

B. the computing logic includes logic for computing a noncondenseables component of the condenser efficiency loss value as a noncondensable multiplier times the difference between the condenser refrigerant pressure and the optimal condenser refrigerant pressure.

Claim 58 (new): The computer-readable medium of claim 39 in which the condenser data includes condenser inlet temperature and a condenser inlet loss component of the condenser efficiency loss value is computed as the condenser inlet temperature times approximately 2.

Claim 59 (new): The computer-readable medium of claim 39 in which:

A. the condenser data includes:

i. a condenser inlet temperature,

ii. a condenser inlet pressure,

iii. a condenser outlet temperature,

iv. a condenser outlet pressure,

v. an optimal condenser water pressure drop; and

B. the program includes logic for computing:

i. an actual condenser water pressure drop as the difference between the condenser inlet pressure and the condenser outlet pressure;

ii. delta variance as the square root of the ratio of actual condenser water pressure drop to optimal condenser water pressure drop;

iii. a final variance as (1 – delta variance) multiplied by (condenser outlet temperature – condenser inlet temperature); and

iv. a condenser flow loss component of the condenser efficiency loss value as the final variance times approximately 2.

Claim 60 (new): The computer-readable medium of claim 39 in which:

A. the condenser data includes an evaporator outlet temperature and an optimal evaporator outlet temperature; and

B. the program includes logic for computing a set point loss component of the evaporator efficiency loss value as approximately two times the difference between the evaporator outlet temperature and the optimal evaporator outlet temperature.

Claim 61 (new): The computer-readable medium of claim 39, in which the inputting logic comprises reading the condenser data and the evaporator data from one or more electronic sensors that collectively measure at least one condenser parameter and at least one evaporator parameter.

Claim 62 (new): The computer-readable medium of claim 39, in which the inputting logic comprises:

A. enabling a portable handheld device to read the condenser data and the evaporator data from a plurality of electronic sensors that collectively measure at least one condenser parameter and at least one evaporator parameter; and

B. receiving the condenser data and evaporator data via the handheld device.

Claim 63 (new): The computer-readable medium of claim 39, in which the program further comprises logic for:

A. enabling a user using a client computer to remotely via a computing network access a server computer associated with the computing device, and

B. transmitting from the client computer to the server computer the condenser data and evaporator data.

Claim 64 (new): The computer-readable medium of claim 39, in which the program further comprises logic for:

A. enabling a user using a client computer to remotely via a computing network access a server computer associated with the computing device, and

B. transmitting from the server computer to the client computer the indication of the condenser remedial action and the evaporator remedial action.

Claim 65 (new): The computer-readable medium of claim 64, in which the program further comprises logic for enabling a provider of services associated with indication of the condenser problem and the evaporator problem to receive monetary compensation from a recipient of the services.

Claim 66 (new): The computer-readable medium of claim 64, in which the program further comprises logic for:

A. enabling the user using the client computer to log on to the server computer;

B. transmitting from the server computer to the client computer an indication of a plurality of chillers about which a user can select to receive information;

C. enabling the user to select at least one of the plurality of chillers; and

D. transmitting from the client computer to the server computer an indication of the selected chiller.

Claim 67 (new): The computer-readable medium of claim 66, in which the plurality of chillers includes a first chiller located at a different place from a second chiller.

Claim 68 (new): The computer-readable medium of claim 66, in which the plurality of chillers includes a first chiller installed in the same building as a second chiller.

Claim 69 (new): A method of using a computing device for evaluating the efficiency of a chiller having a condenser and a compressor motor, comprising the steps of:

A. inputting into the computing device:

i. information sufficient to define a predetermined optimal condenser approach,

ii. condenser refrigerant temperature, and

iii. condenser outlet temperature;

B. sensing a running current of the compressor motor;

C. computing:

i. a fractional load current as the ratio of the running current of the compressor motor to a full load current of the compressor motor;

ii. a full load condenser approach as the ratio of the difference between condenser refrigerant temperature and condenser outlet temperature and the fractional load current;

iii. a condenser approach difference as the difference between the full load condenser approach and the predetermined optimal condenser approach; and

D. computing a condenser approach efficiency loss as the condenser approach difference multiplied by a condenser approach efficiency factor if the condenser approach difference is greater than zero.

IV. Remarks

Claims 1–11 and 39 remain in the application. Claims 12–38 and 40–44 have been withdrawn from further consideration. Claims 45–69 have been newly added to the application so that claims 1–11, 39, and 45–69 are now pending.

A. Inventorship

In ¶ 5 of the Office Action, the Examiner requests clarification of the identity of the inventors because Lawrence J. Seigel is the only named inventor for the application and "Office records for the claim for priority provisional application 60/291,248 indicate the inventive entity being both a Morgan Beard and Lawrence J. Seigel." (Office Action, ¶ 5.) Lawrence J. Seigel is correctly identified as the only inventor of the subject matter claimed in the current application. Pursuant to 37 CFR § 1.48(f), Applicant's filing on March 6, 2002, of the executed declaration naming only Lawrence J. Seigel as an inventor of the subject matter of the application corrects the prior identification in the provisional application of Morgan Beard and Lawrence J. Seigel as inventors.

B. Abstract

Applicant has submitted as an amendment to the specification an Abstract of appropriate length as the Examiner requested in ¶ 6 of the Office Action.

C. Amendments to the Specification

In ¶ 4, the Examiner noted that the Preliminary Amendment filed May 10, 2002, has not been entered and asked that those amendments be resubmitted using the current practice set forth in 37 CFR § 1.121. Applicant amends the specification according to 37 CFR § 1.121 that includes appropriate selections of the May 5, 2002, amendment. Applicant also amends the specification to address the issues raised by the Examiner in ¶¶ 6–11 of the Office Action. Applicant respectfully requests that the Examiner confirm that all issues raised in ¶¶ 6–11 of the

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Office Action have been resolved by the Applicant's amendments. Applicants amendments to the specification contain no new matter.

D. The Rejection of Claims 1–11 and 39

1. Claims 1–11

The Examiner has rejected claims 1, 2, 4, and 39 "under 35 U.S.C. § 103(a) as being unpatentable over McMullin (5,083,438) in view of Whiteside (6,438,981)." (Office Action, ¶ 14.) The Examiner also stated:

> McMullin (Abstract, col. 5 lines 28-36) discloses 'the computing device computing a value ... ..between chiller efficiency and the input chiller operating parameter measurement data'. McMullin (Abstract, col. 5 lines 31 -36) discloses 'the computing device comparing the computed value to a predetermined value to assess chiller efficiency'.

(Office Action, ¶ 14.)

Applicant has amended claim 1 to include steps of "computing a condenser efficiency loss value" and "computing an evaporator efficiency loss value." Neither McMullin, Whiteside, nor any other reference of record disclose or suggest any method of separately quantifying the efficiency of the condenser and evaporator components of a chiller. Instead, McMullin and Whiteside teach methods of calculating the overall efficiency of a chiller using relationships based solely on "evaporator tonnage" as the independent variable and a power requirement factor typically measured in kW/ton. (*See, e.g.*, McMullin, Abstract and 5:31–36; Whiteside, 6:6–32.) McMullin specifically teaches away from calculating separately the efficiency of the condenser as a contributor to overall chiller efficiency when it states: "the actual condenser tonnage (ACT) does not directly affect the calculation of the chiller efficiency." (McMullin, 6:66–68.) Therefore, Applicant respectfully requests that the Examiner consider amended claim 1 and withdraw the rejection of the claim and its dependent claims 2–11.

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2. Claim 39

The Examiner objected to claim 39 under 37 CFR § 1.75(a) for "failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention." (Office Action, ¶ 12.) The Examiner stated that: "as there is no reference to a program/set of instructions being executed it is not clear as written how the functionality of the computer program product is being realized." The Applicant believes that the original claim 39 was not objectionable. Nonetheless, Applicant has amended claim 39 so that it recites a "computer-readable medium having a program . . . comprising logic for:" performing the series of steps that follow. Applicant believes that this amendment alleviates any object that the Examiner may have regarding original claim 39.

Applicant has also amended claim 39 in a manner similar to claim 1 by reciting logic for computing separate condenser efficiency loss value and evaporator efficiency loss value. Applicant respectfully requests that amended claim 39 is allowable over the references of record for the reasons expressed above in connection with amended claim 1.

E. New Claims 45–58

1. Claims 45–47

Applicant presents new claims 45–47, which depend directly upon amended claim 1 and recite specific condenser, evaporator, and compressor data upon which the loss values are calculated. Claims 45–47 are allowable over the references of record for the reasons recited in connection with amended claim 1.

Claims 45–47 are also independently allowable over the references of record. The data recited in claims 45–47 does not include water or refrigerant flow rate as being part of the data on which calculations are based. By contrast, McMullin and Whiteside each base their efficiency calculations at least in part upon flow rate. (*See, e.g.*, McMullin, 5:59–65, Whiteside,

5:20–29 (especially 5:24).) Therefore, Applicant respectfully submits that claims 45–47 are independently allowable over the references of record.

2. Claims 48–69

Newly presented claims 48–60 depend directly or indirectly upon amended claim 39 and are therefore allowable over the references of record for the reasons discussed above in connection with claim 39. Claims 48–60 are also independently allowable over the references of record because they recite that the program includes logic for computing components of the condenser efficiency loss value and components of the evaporator efficiency loss value that are not disclosed or suggested by the references of record. More specifically, claim 48, which depends on claim 39, recites logic for computing a condenser approach loss component of the condenser efficiency loss value. Claims 49–52 depend directly or indirectly on claim 48 and recite further refinements in the logic for computing the condenser approach loss component. Claim 53, which depends on claim 39, recites logic for computing an evaporator approach component of the evaporator efficiency loss value. Claims 54–56 depend directly or indirectly on claim 53 and recite further refinements in the logic for computing the evaporator approach loss component. Claim 57, which depends on claim 39, recites logic for computing a noncondenseables component of the condenser efficiency loss value. Claim 58, which depends on claim 39, recites logic for computing a condenser inlet loss component of the condenser efficiency loss value. Claim 59, which depends on claim 39, recites logic for computing a condenser flow loss component of the condenser efficiency loss value. Claim 60, which depends on claim 39, recites logic for computing a set point loss component of the evaporator efficiency loss value. Independent claim 69 recites a "method of using a computing device for evaluating the efficiency of a chiller" that includes steps for computing a condenser approach efficiency loss that are similar to the logic recited in claim 48 for computing the condenser approach efficiency

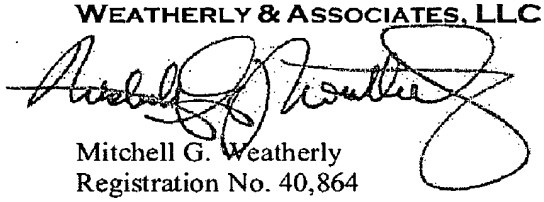
component of the condenser efficiency loss value. The references of record neither disclose nor suggest this analytical method. Therefore, Applicant respectfully submits that claims 48–69 are allowable over the references of record.

V. Conclusion

For all the reasons discussed above, Applicant respectfully requests that the Examiner do the following:

1. enter the amendments to the specification and claims presented in this paper;
2. consider amended claims 1–11 and 39 and new claims 45–69; and
3. allow currently pending claims so that a patent containing claims 1–11, 39, and 45–69 may issue in due course.

Respectfully submitted
on August 20, 2004,
WEATHERLY & ASSOCIATES, LLC



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